



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/003,885	10/25/2001	Anthony J. Ticknor	A070	7551

23623 7590 04/19/2004

AMIN & TUROCY, LLP  
1900 EAST 9TH STREET, NATIONAL CITY CENTER  
24TH FLOOR,  
CLEVELAND, OH 44114

EXAMINER

ARTMAN, THOMAS R

ART UNIT	PAPER NUMBER
----------	--------------

2882

DATE MAILED: 04/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/003,885

Applicant(s)

TICKNOR, ANTHONY J.

Examiner

Thomas R Artman

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 9-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-25 is/are allowed.
- 6) ☒ Claim(s) 26-28,30 and 31 is/are rejected.
- 7) ☒ Claim(s) 29 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 26-28, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ziari (US 6,404,542) in view of Modavis (US 5,881,187) and in further view of Land (US 6,067,391).

Regarding claim 26, Ziari discloses an optical integrated circuit (Fig.3) and a method, including:

- 1) providing a base 312,
- 2) providing a waveguide 314 extending axially through a portion of the base along an optical path, and
- 3) forming a polarization swapping portion 310 in order to mitigate birefringence in the optical circuit.

Ziari does not form the polarization swapping portion in the waveguide. His polarization swapping portion is a separate optical element, formed using polarized light (col.3, lines 32-45), that is placed in the waveguide structure.

Modavis teaches the well-known concept of laser-writing optical elements into waveguides. This is a common practice, particularly with complicated optical elements such as Bragg gratings. Writing optical elements into a waveguide rather than using separate optical elements is well established in the art for several reasons. First, size and cost of the finished optical circuits are greatly reduced. Second, the manufacturing is simplified and the reliability of the resulting circuit is improved since the precise optical alignment of separate elements is not required. The optical elements are formed by exposing photosensitive cores (or claddings) of waveguides in order to change the refractive index in a specific region.

Modavis also teaches that exposing these regions with polarized light has the same effect as disclosed by Ziari, where the birefringent axes of the optical elements are directly affected by the linear polarization state of the laser light and the angle of exposure. Modavis teaches that the angle of exposure can be controlled so that desired birefringent effects can be created in the waveguide.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a polarization swapping portion in Ziari's waveguide, rather than using a separate optical element, for the improved reliability, simplified manufacturing and reduced size and cost as is generally known in the art and as is supported by Modavis.

Further regarding claim 26, Ziari and Modavis do not disclose using a prism in order to direct the pulsed laser light to the waveguide.

Land teaches the use of prisms in waveguide laser writing (Figs. 11 and 12). The use of a prism, over the typical bulk optic designs, more accurately directs light from the pulsed UV laser

Art Unit: 2882

into the waveguide with less complicated optical alignment procedures, as shown in Land's example of writing gratings.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a prism as generally taught by Land such that the direction and coupling of light into the waveguide is more accurate.

Regarding claims 27 and 28, Ziari does not disclose the illumination angle at which his polarization swapping portion is illuminated.

Throughout Modavis's discussion, the teaching is repeated wherein the illumination angle of the linearly polarized light dictates the orientation of the induced birefringent axes, as measured with respect to the principle axes of the waveguide. Furthermore, it is a well-known fact in the art to place a polarizing element, such as a quarter-wave or half-wave element, with its principle axes at approximately 45 degrees to the principle axes of the rest of the optical system in order to function as designed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the polarization swapping portion (half-wave optical element, in Ziari's case) by illuminating the waveguide at 45 degrees from its principle axes such that the portion behaves as a proper polarization swapping element.

With respect to claim 30, Ziari does not specifically disclose the light source used in the formation of the polarization-swapping portion.

Art Unit: 2882

Modavis, however, states that a common light source for waveguide writing include lasers for the appropriate wavelengths desired (UV to visible, col.3, lines 48-51).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a laser as one of several common, well characterized light sources for the appropriate radiation wavelengths.

With respect to claim 31, as stated by Ziari, his polarization swapping portion is, in fact, a half-wave plate.

***Allowable Subject Matter***

Claims 9-25 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record neither teaches nor reasonably suggests the use of a femto-second pulsed laser light for making laser-written optical waveguides as claimed in claims 9 and 17.

Claims 10-16 and 18-25 are allowed by virtue of their dependence.

Claim 29 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record neither teaches nor reasonably suggests the additional limitation of using femto-second pulsed laser light for laser-writing optical waveguides as claimed in claim 29.

***Response to Amendment***

Due to the newly-cited prior art, the examiner must withdraw the allowable subject matter of using a prism for directing light from the laser into the waveguide as stated in the previous Office Action, dated October 10<sup>th</sup>, 2003.


***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 6:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas R. Artman  
Patent Examiner  
April 6, 2004



EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER